

What is claimed is;

1. A copolymer of ethylene and  $\alpha$ -olefin of from 4 to 20 carbon atoms having melt flow rate of from 1 to 100, melt tension at 190°C (MT), intrinsic viscosity ( $[\eta]$ ) and a chain length A satisfying following formula (1) to (3), wherein the chain length A is a chain length at peak position of a logarithm normal distribution curve of a component having the highest molecular weight among logarithm normal distribution curves obtained by dividing a chain length distribution curve obtained by gel permeation chromatography measurement into at least two logarithm normal distribution curves,

$$2 \times \text{MFR}^{-0.59} < \text{MT} < 20 \times \text{MFR}^{-0.59} \quad \text{formula (1)}$$

$$1.02 \times \text{MFR}^{-0.094} < [\eta] < 1.50 \times \text{MFR}^{-0.156} \quad \text{formula (2)}$$

$$3.30 < \log A < -0.0815 \times \log(\text{MFR}) + 4.05 \quad \text{formula (3).}$$

2. A copolymer of ethylene and  $\alpha$ -olefin of from 4 to 20 carbon atoms having melt flow rate (MFR) of from 1 to 100, melt tension at 190°C (MT), intrinsic viscosity ( $[\eta]$ ) and characteristic relaxation time at 190°C ( $\tau$ ; unit is sec) satisfying the following formulas:

$$2 \times \text{MFR}^{-0.59} < \text{MT} < 20 \times \text{MFR}^{-0.59} \quad \text{formula (1)}$$

$$1.02 \times \text{MFR}^{-0.094} < [\eta] < 1.50 \times \text{MFR}^{-0.156} \quad \text{formula (2), and}$$

$$2 < \tau < 8.1 \times \text{MFR}^{-0.746} \quad \text{formula (4).}$$

3. The copolymer of ethylene and  $\alpha$ -olefin according

to Claim 1 or 2, wherein the copolymer of ethylene and  $\alpha$ -olefin has activation energy for melt flow of not less than 60 kJ/mol.

4. The copolymer of ethylene and  $\alpha$ -olefin according to Claim 1 or 2, wherein the copolymer of ethylene and  $\alpha$ -olefin has swell ration (SR) and  $[\eta]$  satisfying following formula (6).

when  $[\eta] < 1.20$ ,  $-0.91 \times [\eta] + 2.232 < SR < 2$

when  $[\eta] \geq 1.20$ ,  $1.17 < SR < 2$ .